



# Conserving Biodiversity on Military Lands

## The Commander's Guide

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# Biodiversity An Essential National and Natural Resource

**For if one link in  
nature's chain might  
be lost, another  
might be lost, until  
the whole of things  
will vanish by  
piecemeal.**

—Thomas Jefferson



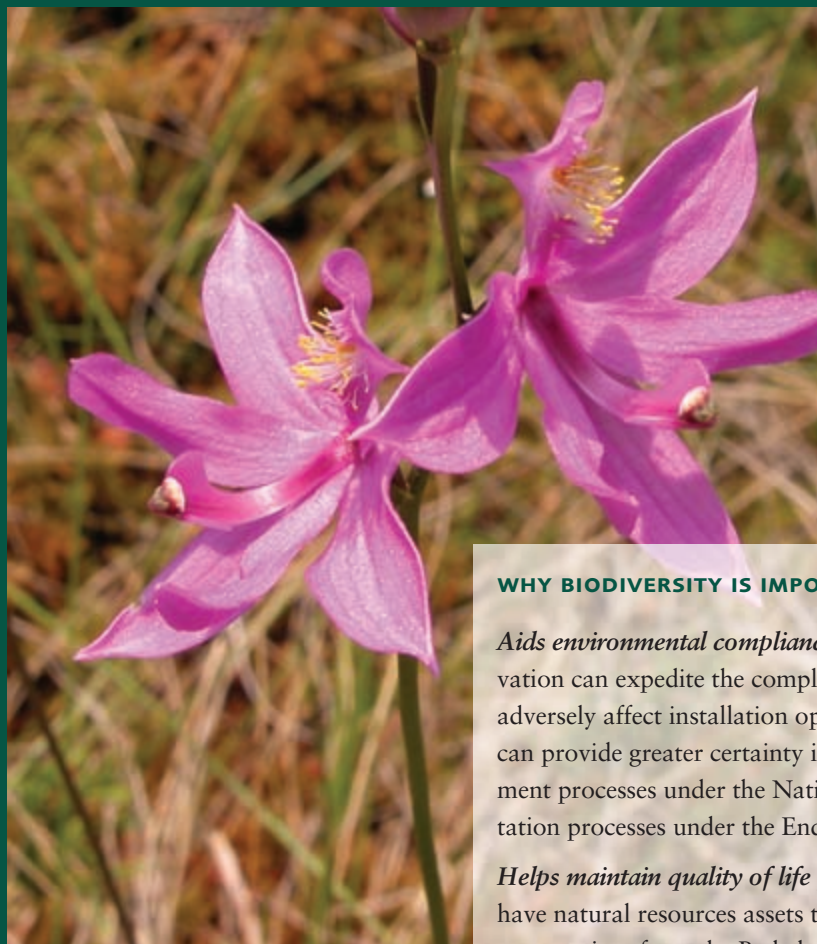
**W**hat is *biodiversity*, and what should a military commander understand about it in order to do his or her job well? Simply stated, *biodiversity* is the total number of species and their abundance in a given area. That could be a specific type of habitat on an installation, or all the variety of life within an installation's boundaries. It could be the diversity of life within a larger regional landscape, the whole country, or the entire planet.

Healthy, well-functioning natural communities tend to be diverse—they contain many different species within a balanced but dynamic web of life. And, they are sustained by natural ecological processes—such as the periodic fires that foster longleaf pine woodlands, seasonal floods that enrich riverbank habitats, and growth of vegetation that can convert a meadow into a mature forest within a few decades.

Biodiversity provides people with tangible and intangible benefits to our economy, our health, and our quality of life. For installation leaders, maintaining biodiversity also helps to ensure training and troop readiness. Our soldiers, airmen, sailors, and marines need to train as they expect to fight. To do so successfully requires access to environments similar to those expected to be encountered in combat.







**A country worth defending is a country worth preserving.**

—Major General Michael R. Lehnert,  
Commanding General,  
Marine Corps Installations West

#### WHY BIODIVERSITY IS IMPORTANT TO THE MILITARY'S MISSION

***Aids environmental compliance and averts legal conflicts.*** Biodiversity conservation can expedite the compliance process and help avoid conflicts that could adversely affect installation operations. Proactive management for biodiversity can provide greater certainty in mitigation for Environmental Impact Assessment processes under the National Environmental Policy Act as well as consultation processes under the Endangered Species Act.

***Helps maintain quality of life for installation personnel.*** Commanders not only have natural resources assets to care for, they also have responsibilities for a community of people. By helping to maintain aesthetically pleasing surroundings and expanding opportunities for outdoor recreation, such as hunting, fishing, and wildlife viewing, biodiversity can improve the quality of life of our nation's military personnel and their families.

***Provides realistic training conditions for troops.*** Biodiversity conservation is essential for sustaining the natural landscapes required for realistic training and testing. Managing for biodiversity can help ensure that lands and waters are maintained in a healthy condition, and thereby facilitate greater flexibility for military operations.

***Protects installation resources.*** Biodiversity conservation is a central component of ecosystem management, which has been embraced as the DoD's natural resources management strategy. Given the DoD's significant investment in conserving and protecting the environment, this strategy promises the greatest return on investment, and is more cost effective than habitat restoration or creation. It is simply the right thing to do and the smart way of doing business.

***Helps build good relations with citizens beyond the fence line.*** U.S. citizens expect that federal land managers demonstrate responsible stewardship of public lands. The practice of biodiversity conservation fosters good will within communities surrounding military installations, which in turn engenders public support for the military mission.



Opposite: Longleaf pine habitat, Fort Stewart, Georgia, (Photo courtesy of U.S. Army). Opposite inset: Yellow-throated warbler, NAS Patuxent River, Maryland, (© Arlene Ripley). Top: Orchid, Warren Grove Air National Guard Range, New Jersey, (© Douglas Ripley). Above left: Carnivorous pitcher plants, Fort Bragg, North Carolina, (Photo courtesy of Fort Bragg).



**1994: IMPLEMENTATION OF ECOSYSTEM MANAGEMENT IN THE DOD.** The goal of this initial policy statement was to maintain and improve the sustainability and native biological diversity of terrestrial and aquatic, including marine, ecosystems while supporting the DOD mission.

**1996: DOD CONSERVATION INSTRUCTION (DODI 4715.3: CURRENTLY UNDER REVISION).** This DOD policy recognizes the close interrelationship between ecosystem management and accomplishing biodiversity conservation. Consistent with maintaining the military mission, this policy adopted the following biodiversity-related goals:

- maintain or restore remaining native ecosystem types across their natural range of variation;
- maintain or reestablish viable populations of native species in an installation's areas of natural habitat;
- maintain evolutionary and ecological processes, such as disturbance regimes, hydrological processes, and nutrient cycles;
- manage over sufficiently long time periods for changing system dynamics;
- accommodate human use.

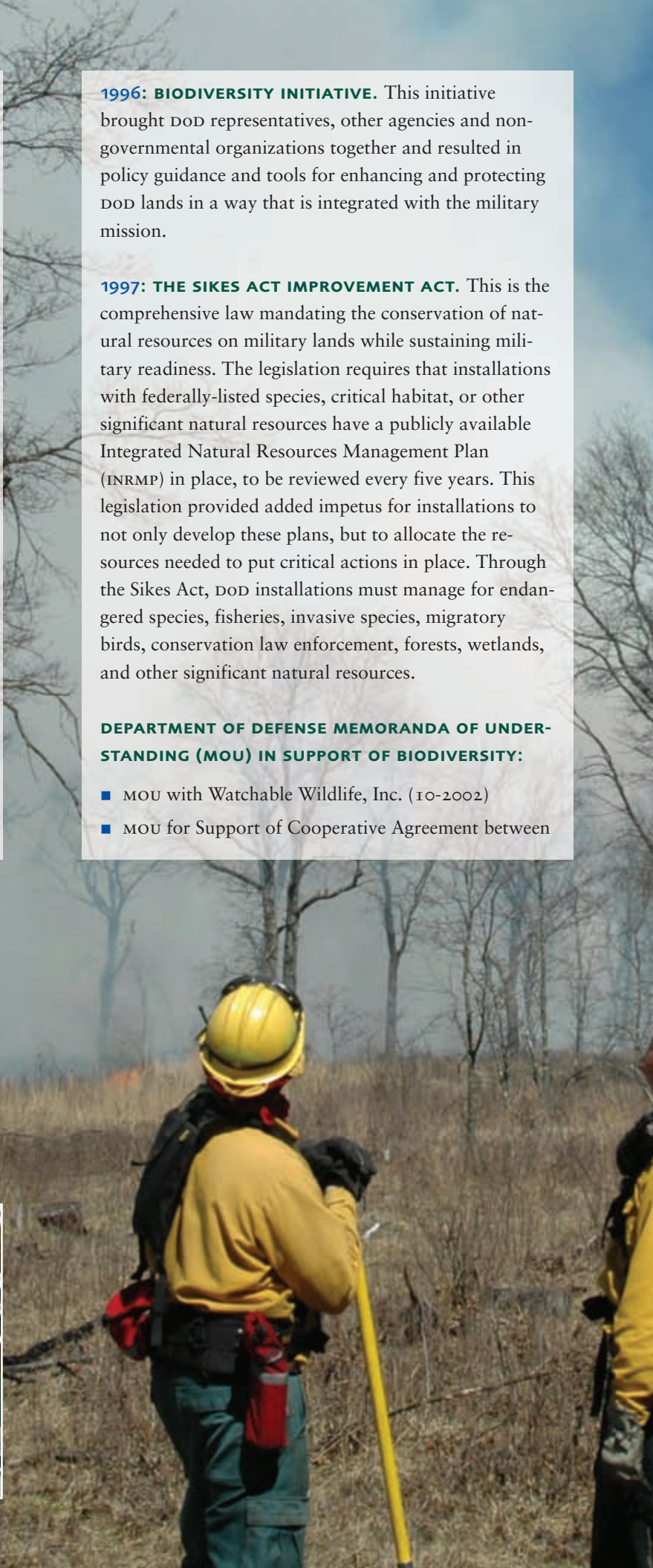
**1996: BIODIVERSITY INITIATIVE.** This initiative brought DOD representatives, other agencies and non-governmental organizations together and resulted in policy guidance and tools for enhancing and protecting DOD lands in a way that is integrated with the military mission.

**1997: THE SIKES ACT IMPROVEMENT ACT.** This is the comprehensive law mandating the conservation of natural resources on military lands while sustaining military readiness. The legislation requires that installations with federally-listed species, critical habitat, or other significant natural resources have a publicly available Integrated Natural Resources Management Plan (INRMP) in place, to be reviewed every five years. This legislation provided added impetus for installations to not only develop these plans, but to allocate the resources needed to put critical actions in place. Through the Sikes Act, DOD installations must manage for endangered species, fisheries, invasive species, migratory birds, conservation law enforcement, forests, wetlands, and other significant natural resources.

**DEPARTMENT OF DEFENSE MEMORANDA OF UNDERSTANDING (MOU) IN SUPPORT OF BIODIVERSITY:**

- MOU with Watchable Wildlife, Inc. (IO-2002)
- MOU for Support of Cooperative Agreement between

## DoD Policy Supporting Biodiversity





the Department of Defense and The Nature Conservancy (04-2005)

- MOU for the Continuation of the Cooperative Ecosystem Studies Units Network (05-2005)
- MOU between the Department of Defense and the National Biological Information Infrastructure (NBII) (06-2005)
- MOU among the Department of Defense, the U.S. Fish and Wildlife Service, and the Association of Fish and Wildlife Agencies for a Cooperative Integrated Natural Resource Management Program on Military Installations (01-2006)
- MOU for Conservation of Migratory Birds (07-2006)
- MOU for Federal Native Plant Conservation (09-2006)
- MOU between the Department of Defense and Bat Conservation International (10-2006)
- MOU between USDA Natural Resources Conservation Service and Department of Defense to Promote Cooperative Conservation (11-2006)
- MOU among Federal Agencies for Achieving Objectives of the PARC (Partners in Amphibian and Reptile Conservation) (03-2007)
- MOU among Members of the U.S. North American Bird Conservation Initiative Committee (06-2007)
- MOU with North American Pollinator Protection Campaign (06-2007)



**Long experience by the DoD with the management of the natural resources on its nearly 30 million acres of land has shown that the environmental health of these lands is absolutely essential for realistic and sustainable military testing and training.**

—Alex A. Beehler, Assistant Deputy Under Secretary of Defense, Environment, Safety and Occupational Health

Opposite and left: Crew members observing smoke from prescribed burn, Fort McCoy, Wisconsin, (© Jim Kerkman). Opposite inset: Air Force operators and biologists consult on endangered species protection, Gila National Forest, New Mexico. (©Douglas Ripley). Above: Natural resources managers and biologists, Dobbins Air Reserve Base, Georgia, (© Douglas Ripley). Below: Encroachment of suburban development on Marine Corps Base Camp Pendleton, California, (© Douglas Ripley).







# Biodiversity Management in Action

## **MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA** **ADDRESSING ENCROACHMENT THROUGH PARTNERSHIPS**

At Camp Lejeune in eastern North Carolina, more than a few are proud of the way that conserving natural habitats has been linked with maintaining fighting readiness. The region's rapid growth is encroaching on the base, and noise complaints from nearby residential developments are on the rise. The Marine Corps has effectively engaged stakeholders by partnering with agencies and conservation groups to form the Onslow Bight Conservation Forum. Through this partnership, thousands of acres adjacent to Lejeune have been placed under easement or acquired by conservation groups, helping to buffer the base from encroachment while conserving a rich mosaic of marshes, longleaf pine savannas, and other coastal ecosystems.

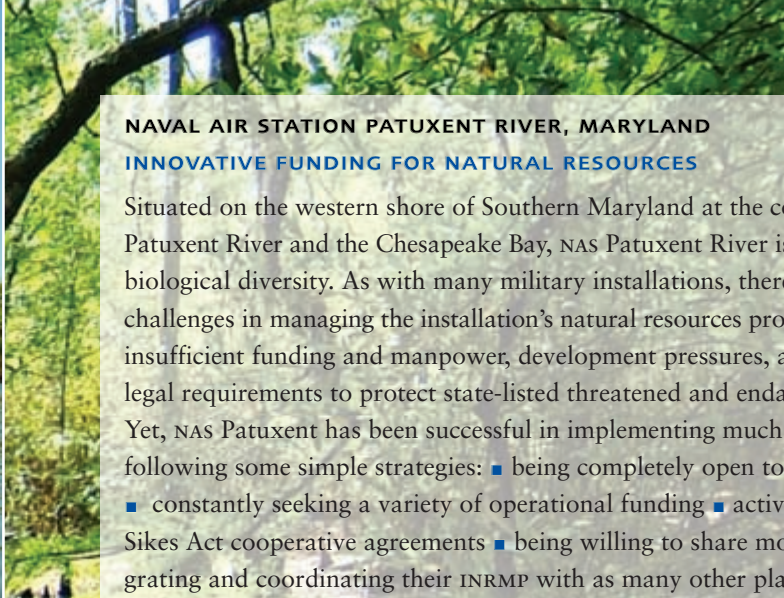
## **FORT STEWART AND HUNTER ARMY AIRFIELD, GEORGIA** **COOPERATIVE CONSERVATION PLANNING**

Fort Stewart and Hunter Army Airfield are home to the 3rd Infantry Division. Combined, they form the Army's premier power projection platform on the Atlantic Coast, covering 280,000 acres in southeast Georgia. The natural resources on Fort Stewart and Hunter Army Air Field are extensive and diverse, with over 90,000 acres of wetlands and 260 miles of streams and rivers. Fort Stewart is also home to the largest remaining acreage of longleaf pine wiregrass ecosystem in Georgia.

To reduce conflicts between competing INRMP goals and objectives, Fort Stewart developed an internal coordinating process that allows for all involved agencies to provide input on specific actions, provides a forum for discussing the best approach and timing for specific INRMP projects, eliminates or significantly reduces potential conflicts, and ensures buy-in and consensus to meet INRMP goals and objectives. By focusing on cooperative management and establishing a system of internal coordination, Fort Stewart has developed a highly successful natural resources program.







#### NAVAL AIR STATION PATUXENT RIVER, MARYLAND INNOVATIVE FUNDING FOR NATURAL RESOURCES

Situated on the western shore of Southern Maryland at the confluence of the Patuxent River and the Chesapeake Bay, NAS Patuxent River is a rich island of biological diversity. As with many military installations, there are constant challenges in managing the installation's natural resources program, including insufficient funding and manpower, development pressures, and the lack of legal requirements to protect state-listed threatened and endangered species. Yet, NAS Patuxent has been successful in implementing much of its INRMP by following some simple strategies: ■ being completely open to any and all help ■ constantly seeking a variety of operational funding ■ actively pursuing Sikes Act cooperative agreements ■ being willing to share most data ■ integrating and coordinating their INRMP with as many other plans as possible ■ being open to new natural resources management approaches that save money while enhancing biodiversity.

#### DEFENSE FUEL SUPPORT POINT, SAN PEDRO, CALIFORNIA CONSERVING AN ENDANGERED SPECIES

The Defense Fuel Support Point is a Defense Logistics Agency (DLA) site that supplies aircraft and marine fuel to 28 military bases and activities in California, Arizona, and Nevada. It is also home of the Palos Verdes blue butterfly, a postage stamp-sized butterfly that was long thought to be extinct. In 1994 a tiny relict population of approximately 65 individuals was discovered on the fuel depot. The DLA quickly recognized not only that the protection of this species was a legal responsibility, but that its recovery could bring great public support for the DLA mission on the Palos Verdes peninsula and for the Department of Defense in general. Consequently, through conservation efforts led by DLA, captive breeding stock of the butterfly has increased from 186 to 4,700 individuals as of 2008, with habitat improvements and expansion continuing.



#### BEALE AIR FORCE BASE, CALIFORNIA

##### ACCOMMODATING MULTIPLE USES

Beale AFB, situated in the northern Sacramento Valley of California, is home to numerous highly sensitive vernal pool wetlands and has a long history of addressing wetland regulatory requirements. Complying with those requirements can be burdensome and expensive, and can complicate meeting the military mission. The U.S. Army Corps of Engineers has outlined an ecosystem-based approach to address these requirements, known as Special Area Management Planning, that Beale successfully employed through the development of its Habitat Conservation and Management Plan (HCMP).

The HCMP outlines a multi-species approach to natural resources conservation by protecting large tracts of land that provide habitat for many species of plants and wildlife. The HCMP also includes mitigation plans for adverse effects on natural resources associated with implementation of the Beale AFB General Plan, as well as guidelines for Endangered Species Act and Clean Water Act compliance for future projects.

Opposite and above: Alligator Lake, MCB Camp Lejeune, North Carolina. (© DoD Legacy Program)

Opposite, far left bottom: Red-cockaded woodpecker in artificial nest cavity. (© Arlene Ripley)

Above inset: Harper's Creek, NAS Patuxent River, Maryland. (© Douglas Ripley)

Above right: Palos Verdes blue butterfly. (© David Severin, Defense Logistics Agency)



# The Military Legacy and Stewardship

**T**he military's role in discovering and conserving America's remarkable natural heritage is noteworthy. Pioneering military-naturalist missions, including the Lewis and Clark Expedition of 1803–1806 (Corps of Discovery) and the 1838–1842 United States Exploring Expedition mission led by Captain Charles Wilkes, USN, mapped and described the coasts, rivers, and interior of our young nation. In the mid-19th century, exploration and documentation continued through expeditions led by explorer and plant collector Major General John C. Frémont. From 1872 until the establishment of the National Park Service in 1916, the U.S. Army was charged with managing and protecting our national parks.

During the two world wars, military training needs resulted in the individual armed forces acquiring substantial land bases of their own. After WWII, natural resource stewardship activities, including erosion control, wildlife management, forestry, and farming, gradually became integrated with the overall operation of most military installations.

Lands now managed by the DoD in the U.S. cover nearly 30 million acres, from mountains to shoreline, from deserts to the Pacific Islands. This great range of terrains and climates gives soldiers, sailors, airmen, and marines the opportunity to train in the types of places where they may be called to fight. It also provides habitat for a rich array of wildlife, including hundreds of federally listed threatened and endangered species and species at risk needing federal protection.

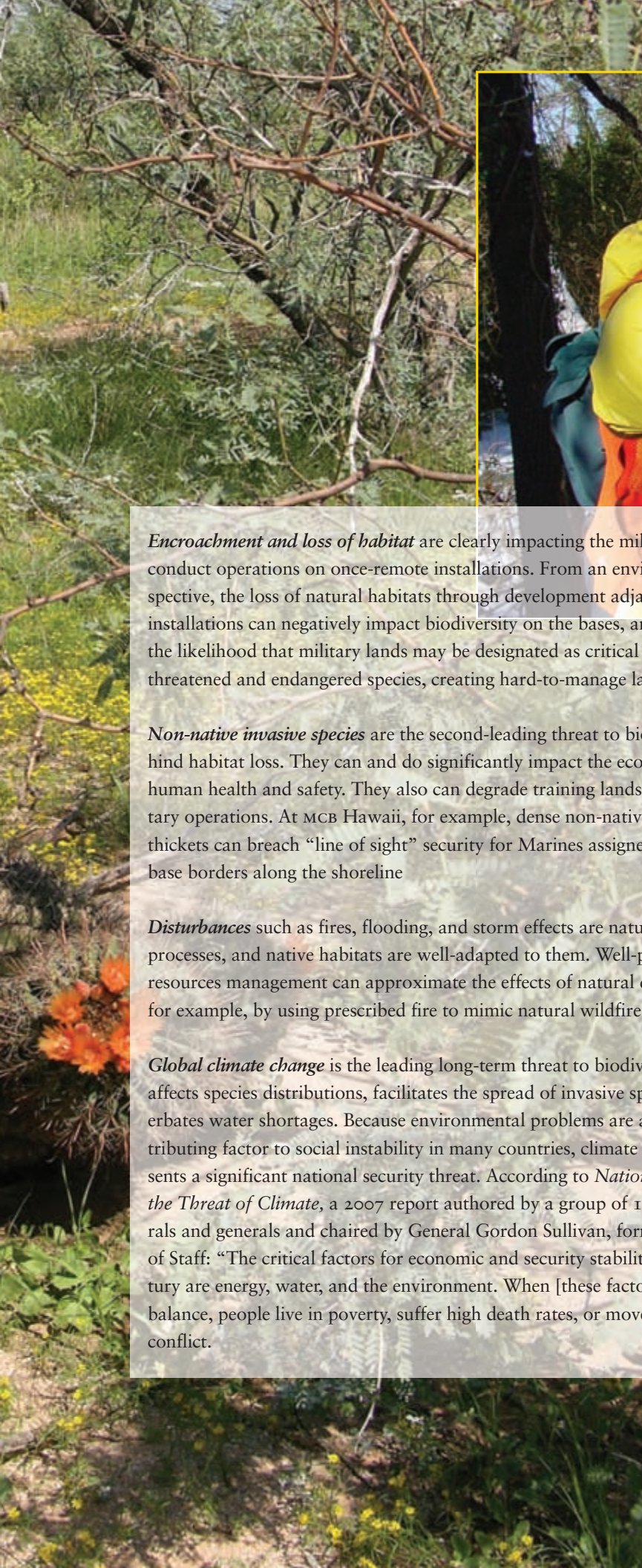
In fact, a 2007 analysis by NatureServe found that DoD-managed lands harbor the greatest density of species listed under the Endangered Species Act of any federal land management agency (nearly as many listed species as on Forest Service lands, for example, in an area just one-eighth as large). Installations in Hawaii, California, and Florida rank among the highest. However, regardless of the extent or type of ecosystems and the species found on military installations, these lands are important because they are part of a larger whole.



**The mission of the Department of Defense is more than aircraft, guns, and missiles. Part of the defense job is protecting the waters, timber and wildlife, the priceless natural resources that make this great nation of ours worth defending.**

—General Thomas D. White, former Air Force Chief of Staff





**Encroachment and loss of habitat** are clearly impacting the military's ability to conduct operations on once-remote installations. From an environmental perspective, the loss of natural habitats through development adjacent to military installations can negatively impact biodiversity on the bases, and also increases the likelihood that military lands may be designated as critical habitat for threatened and endangered species, creating hard-to-manage land-use conflicts.

**Non-native invasive species** are the second-leading threat to biodiversity behind habitat loss. They can and do significantly impact the economy, as well as human health and safety. They also can degrade training lands and affect military operations. At MCB Hawaii, for example, dense non-native mangrove thickets can breach "line of sight" security for Marines assigned to protect base borders along the shoreline

**Disturbances** such as fires, flooding, and storm effects are natural ecological processes, and native habitats are well-adapted to them. Well-planned natural resources management can approximate the effects of natural disturbances—for example, by using prescribed fire to mimic natural wildfire cycles.

**Global climate change** is the leading long-term threat to biodiversity. Already it affects species distributions, facilitates the spread of invasive species, and exacerbates water shortages. Because environmental problems are a major contributing factor to social instability in many countries, climate change also presents a significant national security threat. According to *National Security and the Threat of Climate*, a 2007 report authored by a group of 11 retired admirals and generals and chaired by General Gordon Sullivan, former Army Chief of Staff: "The critical factors for economic and security stability in the 21<sup>st</sup> century are energy, water, and the environment. When [these factors] are not in balance, people live in poverty, suffer high death rates, or move towards armed conflict.

## Key Biodiversity Management Issues

Opposite and left: Davis-Monthan Air Force Base, Arizona. (© Douglas Ripley)

Opposite inset: Major General John C. Fremont. (© University of Utah)

Above: Timber inventory, Andrews Air Force Base, Maryland. (© Douglas Ripley)



# Key Principles for Commanders

**T**he challenges that natural resources managers face vary widely. Some installations comprise many thousands of acres and support large populations of rare species or sensitive natural communities, while others are more modest in scale. But creative and successful approaches to managing ecological resources on military lands are found across the country and across the military services. While the cases described here are outstanding examples, successful experience at dozens of installations, large and small, in the past two decades have led to a clear set of guiding principles for effective biodiversity conservation in a military setting.

- ***Focus on the military mission.*** Place the conservation work in the context of military readiness, enabling managers to tackle the problems with intensity and efficiency.

- ***Establish and implement a solid Integrated Natural Resources Management Plan.*** A clear and reliable INRMP, developed in cooperation with stakeholders, is the essential foundation for all natural resources management.

- ***Seek out and rely on the best available science.*** Management practices based on sound science are more defensible and more likely to achieve consensus among diverse stakeholders. A sound scientific basis improves the adaptability and effectiveness of management actions. Monitoring and evaluating the effects of management actions is essential.

- ***Adopt an ecosystem-based management approach.*** Focus on the health of the entire ecosystem, as opposed to any one species. Address underlying processes while taking into account not only ecological, but also economic and social concerns.

- ***Think regionally and work across boundaries.*** Consider the broader landscape to better understand the role that the installation's lands play in regional conservation issues, as well as the impact that outside land uses have on the installation's ability to meet both mission and conservation objectives.

- ***Form partnerships and establish trust.*** Successful partnerships require establishing working relationships based on trust, even where values or cultures differ. Working beyond the fenceline requires regular two-way communication with stakeholders and the public. The expertise of state fish and wildlife agencies, the U.S. Fish and Wildlife Service, land trusts, and groups such as NatureServe and The Nature Conservancy is highly useful.







**In utilizing and conserving the natural resources of the Nation, the one characteristic more essential than any other is foresight.**

—Theodore Roosevelt



#### TO LEARN MORE

■ This pamphlet provides a brief overview of relevant biodiversity and natural resources management issues. A complete discussion is provided in the companion book, *Conserving Biodiversity on Military Lands: A Guide for Natural Resources Managers* (2008 Edition). A DVD containing an electronic copy of the book as well as other biodiversity tools has been provided to all military natural resources managers. To obtain a copy of the DVD, contact the DoD Legacy Resource Management Program office at 703-604-1774 or 703-604-1933.

■ Visit the project website at [www.dodbiodiversity.org](http://www.dodbiodiversity.org), which includes the book, a library of case studies, and additional links and resources.

■ The DENIX (Defense Environmental Network and Information Exchange) website ([www.denix.osd.mil](http://www.denix.osd.mil)), maintained by the DoD Environment, Safety and Occupational Health program, is a comprehensive portal for all critical documents and links related to environmental issues.

■ The DoD Office of Environment, Safety, and Occupational Health provides guidance and financial assistance to DoD efforts to preserve natural and cultural heritage while supporting military readiness.

NatureServe is a non-profit organization dedicated to providing the scientific basis for effective conservation.

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